

about a hundred miles to the southward, it was often necessary to depend more on the density of the water, on account of the subsidence of the sediment.

Without entering into the details it may be sufficient to state that, whilst the waters of the Yang-tse, according to my observations, became permanently free from sediment, and assumed the more marked characters of seawater, with a minimum density of 1.018, at a distance of about forty miles east of Wusung, they still retained their yellow colour and turbid appearance, with a density varying between 1.005 and 1.011, on the outskirts of the Chusan archipelago, about a hundred miles to the southward. From these data the conclusion may very naturally be drawn that the main body of the water discharged by the Yang-tse flows comparatively undisturbed in a southerly direction across the Hang-chu Bay to the Chusan archipelago. The southerly extension of the muddy waters of the Yang-tse in the neighbourhood of Chusan¹ must have been a frequent subject of remark to any one approaching Shanghai from the southward, and should he at some subsequent period undertake the voyage from that port to Nagasaki, he will be very probably surprised to find himself, some four or five hours after leaving Wusung, surrounded by the green waters of the Eastern Sea. The situation of the Great Yang-tse bank, which extends one hundred and fifty miles to the north-east from the mouth of the river, would appear to negative the conclusion at which I have arrived; but I am inclined to view this bank—lying as it does rather off the entrances to the river, and composed as it is of fine grey sand—as rather the work of a past period, when perhaps the bulk of the waters found a passage to the north of the island of Tsung-ming, than as being in actual formation at present. That a vast amount of sediment is deposited to the southward of the estuary at the present time we have the most undoubted testimony in the rapid shoaling of the sea amongst the islands of the Chusan archipelago, and along the shores of the Hang-chu Bay, which has caused channels at one time navigable for junks to be now impassable.

With reference to the general effect of the water discharged by the Chinese rivers on the density of the Yellow Sea and of the Gulf of Pe-chili, I may observe that in the month of October I found the specific gravity to rise slowly from 1.019 at the base of the Great Yang-tse bank—a point between fifty and sixty miles east of Wusung—to 1.023 amongst the islands of the Korean archipelago; and that the maximum of 1.024 was attained at a point mid-way between this archipelago and the Shantung promontory. North of this cape the density does not vary in any marked degree, but after the Miautau Islands were passed—a group which separates the Gulf of Pe-chili from the Yellow Sea—there was a gradual diminution, until, at our nearest point of approach to the Yellow River, the mouth of which was forty-five miles distant, the specific gravity was 1.021. This slight fall in the density was the *only indication* of our proximity to such a large river as the Hoang-ho—a circumstance which has a particular bearing on the excessive amount of sediment which this river has been estimated to discharge (*vide* NATURE, vol. xxii. p. 487). From this point to the mouth of the Pei-ho the specific gravity continued to decrease, until at a point about twenty-three miles from the mouth of this river, where the discolouration from sediment was first observed, it was 1.020. Thence to the Taku forts the density rapidly fell.

We may thus place the specific gravity of the Gulf of Pe-chili at from 1.020 to 1.023, and that of the Yellow Sea at from 1.022 to 1.024, whilst the difference between these densities and that of oceanic water—1.027—will represent the combined effect of the discharge of the

Pei-ho, the Yellow River, and to a less degree of the Yang-tse, on the specific gravities of the seas in question.

I must conclude with an observation on the erroneous notion which the appellation of "Yellow Sea" must convey to the minds of most men. For however much the Yellow Sea may have merited the epithet of "yellow" when it received the waters of the Hoang-ho about a quarter of a century ago—though if an inference is to be drawn from the present condition of the Gulf of Pe-chili it could scarcely have been entitled to it even at that period—it has no claim whatever to it now. Free from sediment and dark green in colour, except in the immediate vicinity of the estuary of the Yang-tse, the Yellow Sea has been more appropriately named by Chinese sailors—"The Black-water Ocean." H. B. GUPPY

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PROFESSOR GEIKIE IN ARRAN

AMONG the many features which have lent attraction to the study of geology at Edinburgh University, Prof. Geikie's field demonstrations have always held a conspicuous place. Few favourable Saturdays have been allowed to pass, on which he might not be seen rambling with his class through some wooded glen, or climbing some rugged brae, with hammer, sketch-book, and map-case, and every now and then stopping to point out some striking rock section, or to examine a "find," made perchance by one of his students. But at the end of the session, when a week or ten days are devoted to the exploration of some district possessing an interesting geological structure, the "long excursion" is always looked forward to with the keenest delight by professor as well as by students. The first long class-excursion ten years ago was to Arran, and the Professor decided that his last should also be to that island—famous alike for the beauty of its scenery and for the interest attaching to its geological framework. Quarters were taken up at Corrie Hotel on Monday April 24, and that afternoon saw the whole party, numbering about a score, roaming with bags and hammers along the coast towards North Glen Sannox, and making the acquaintance of the coarse red sandstones and brecciated white quartz conglomerates of the Upper Old Red, or Lower Calciferous Sandstone series, which extend in a broad belt round that part of the island. Further inland, a coarse conglomerate made up of well-rounded pebbles of pinkish quartz interstratified with characteristic dark chocolate-coloured sandstones and occasional argillaceous beds, was ascertained some years ago by the Professor to belong to the Lower Old Red Sandstone, and to be brought down by a fault against the schists that fringe the mountainous granitic core of the northern half of the island. He had already made some progress with a geological map of the island on a scale of six inches to a mile, and he now purposes to continue this work with the co-operation of his students. Resuming his geological boundary-lines at Glen Sannox, the party was soon scouring the hillsides far and near, in search of rock-sections and exposures, while he, map in hand, remained within ear-shot, and superintended operations, marking down the lines of junction, and unravelling the geological structures with the skilful hand of one long acquainted with the art of geological mapping. In this way several miles of the boundary between the granite and schists were mapped. In the course of a walk along the steep craggy Suidhe Fearghus, on the north side of Glen Sannox, the trend of this remarkable ridge was found to coincide with that of the vertical joint in the granite, and the deep gashes which indent its profile were observed to be due sometimes to cross joints, sometimes to basalt dykes which, decomposing, have weathered down much faster than the surrounding granite. The view from Caisteal Abhail, the highest peak (2735 feet) of the ridge, was magnificent, extending

¹ I may take this opportunity of observing, that on one occasion when off the northern extremity of Chusan, I noticed several large medusæ floating on the surface of the water, which was not only muddy in appearance but had a density of 1.006.

southwards to Ireland, and northwards to the mountains of Mull and Arrochar. On the way down a dyke much more vitreous and obsidian-like than the other Arran pitch-stone, was crossed on the ridge between Caisteal Abhail and Cir Mhor, at the head of Glen Sannok. Another day the steps of the party were turned southwards, and as the red rocks of Glen Shurig, which runs inland from Brodick, had hitherto yielded no organic remains capable of identifying their precise geological position, the Professor instituted a methodical search, which resulted in the discovery of numerous more or less distinct impressions of the lycopod *psilophyton*, clearly proving them to be, as he had inferred, of Lower Old Red Sandstone age. Striking southward into Glen Dubh, the geologists then crossed the very perfect series of moraines, left there by the last valley glacier, and returning by Glen Cloy, and the well-known pitchstone dyke behind the Brodick Schoolhouse. The fossiliferous limestones and shales of Corrie were also well explored, and the position of this strata far down in the heart of the red sandstone series was remarked.

The concluding ramble of the week brought the party to the celebrated dyke of pitchstone at Corriegills, and the quartz-porphry of Dur Dubh, both possibly of Tertiary age.

The latter rock is alike remarkable for its petrographical characters and its geological structure and history. The quartz in it has crystallised into singularly perfect doubly-terminated pyramids, which can be picked up in handfuls from weathered crannies of the rock. Viewed from the north, the end of the quartz-porphry ridge is seen to present a remarkable columnar arrangement, the columns radiating from a common centre like the ribs of a fan. The Professor pointed out the resemblance of this structure to that of the west end of the Scur of Eigg, where a stream of vitreous lava has flowed into and filled up a narrow valley, the sides of which have disappeared, and where the radial structure of the pitchstone is due to the rock having cooled in an approximately semicylindrical gorge, perpendicular to whose sides the columns were formed. In each case the superior durability of the mass has enabled it to resist denudation better than the surrounding rocks, which have long ago been carried off, leaving the lava standing up as a prominent ridge. Most of the students left Brodick by the afternoon steamer on Saturday, after a most enjoyable week of geologising with Prof. Archibald Geikie on the last of the delightful long excursions with his Edinburgh class. H. M. C.

NOTES

THE following telegram from the Special Correspondent of the *Daily News* with the Eclipse Expedition to Egypt, appears in Tuesday's issue:—"Sohag, Monday, 7.20 p.m.: Every facility has been granted to the Eclipse Expedition by the Egyptian Government. The site chosen is close by the bank of the Nile. The instruments are being set up. The Khedive has shown great interest in the Expedition, and the English party, who are his guests, owe much to the arrangements made by the Governor. The officials and natives are everywhere civil and obliging. The weather apparently is quite settled." Under date of May 9 the *Times* correspondent telegraphs as follows:—"The various Eclipse expeditions arriving at Sohag are being entertained by the Khedive. Most important help has been given by Muktar Bey, the Colonel of the Staff representing the Khedive, and the Government, who have also provided a steamer and a military guard."

SINCE we noticed the pamphlet of Prof. Bloxam on the state of affairs at the Royal Military Academy, the subject has been brought before the House of Lords with some prominence; but the main points of complaint appear to have been ignored. If only a portion of the charges in Prof. Bloxam's pamphlet can be sus-

tained, they reveal a very deplorable want of discipline in an important and expensive public establishment, and also a feeling on the part of the authorities that subjects like physics and chemistry are of such minor importance to the scientific soldier as to warrant the withholding of the moral support to maintain discipline that Prof. Bloxam complains of. Some of the statements in the pamphlet are so severe that we hesitated to repeat them, but they do not appear to have been controverted. The position of a professor of a subject that is only looked upon as a sort of useless "extra," deprived to a great extent of the moral support of the heads of the establishment, cannot be a satisfactory one, and if the late Professor's charges and statements are correct, his successor is not to be envied.

WE regret to record the sudden death of Mr. Charles Hockin, at the early age of forty-two, in the midst of an active career as a civil engineer and electrician, on Wednesday, April 26 last. C. Hockin entered St. John's College, Cambridge, in October, 1859, from Aldenham Grammar School, and was elected scholar in the following May. After a successful career in mathematical work at his college he graduated as Third Wrangler in 1863. Choosing engineering as a profession he became pupil to Messrs. Forde and Fleeming Jenkin, and devoted his attention mainly to submarine telegraphy, a province in which his great mathematical abilities found scope, and in which he did much good work. He made, however, opportunities for other purely scientific pursuits, and co-operated with the late Dr. Matthiessen in his researches on the reproduction of electrical standards by chemical means, and also with Sir William Thomson and Clerk-Maxwell in the determination of the B.A. units of electrical resistance and capacity, as well as in the design and construction of the large standard electro-dynamometer for the Committee of the British Association. He was one of the earliest investigators of the resistance of selenium, a material to which so much attention has lately been devoted. His researches on the subject are referred to in the B.A. Report for 1867. In 1872 he joined as a partner the firm of Clark, Forde, and Co., and in the execution of his professional work visited every quarter of the globe, winning the respect and esteem of all with whom he came in contact and the affection of the few he admitted to his intimacy. While there have been few scientific men less eager than he was for personal fame, it is seldom that equal powers have been placed so readily as his were at the service of others, and there was no one whose opinion on the subjects to which he devoted himself was held in greater respect by scientific men. He devoted much time to mathematical investigations chiefly in connection with electricity, but comparatively little of his work has been published by himself, and it is to be hoped that his executors will see their way to the editing and publication of his mathematical papers.

WE learn from Prof. Ray Lankester that another zoological laboratory is to be erected on the shores of the Mediterranean. The French Government has decided to establish at Villafranca near Nice a zoological station, the sole object of which will be to provide accommodation to the numerous naturalists who every year are attracted to this locality by its great reputation as a hunting ground for marine animals. Dr. Jules Barrois, the distinguished embryologist, has been appointed director of the zoological station of Villefranche-sur-Mer. The existence near Nice of a laboratory accessible to strangers, approved by the director, will be an immense boon to English naturalists especially, since the Riviera is not separated from us by a very long journey, is a favourite resort of our countrymen, and is on the whole salubrious. It is the most favourable spot for the study of the Mediterranean fauna by the naturalists of northern countries; and though the new laboratory will by no means compete with or diminish the value of that at Naples, yet it will render possible a short visit to the Mediterranean for the purpose of